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Next Generation Internet Overview

Satellite Networks Workshop
Cleveland, Ohio
June 3, 1998

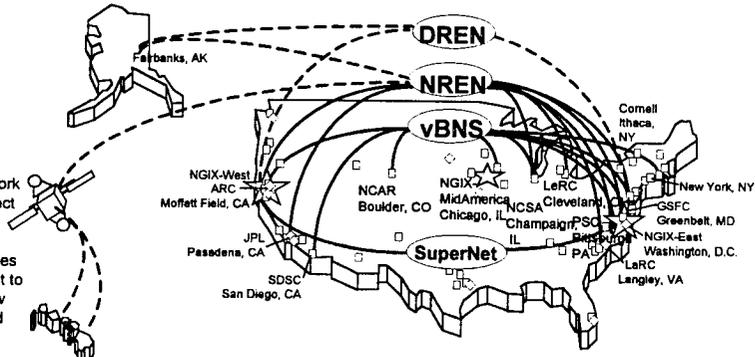
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NGI Overview Next Generation Internet Architecture

Goals:

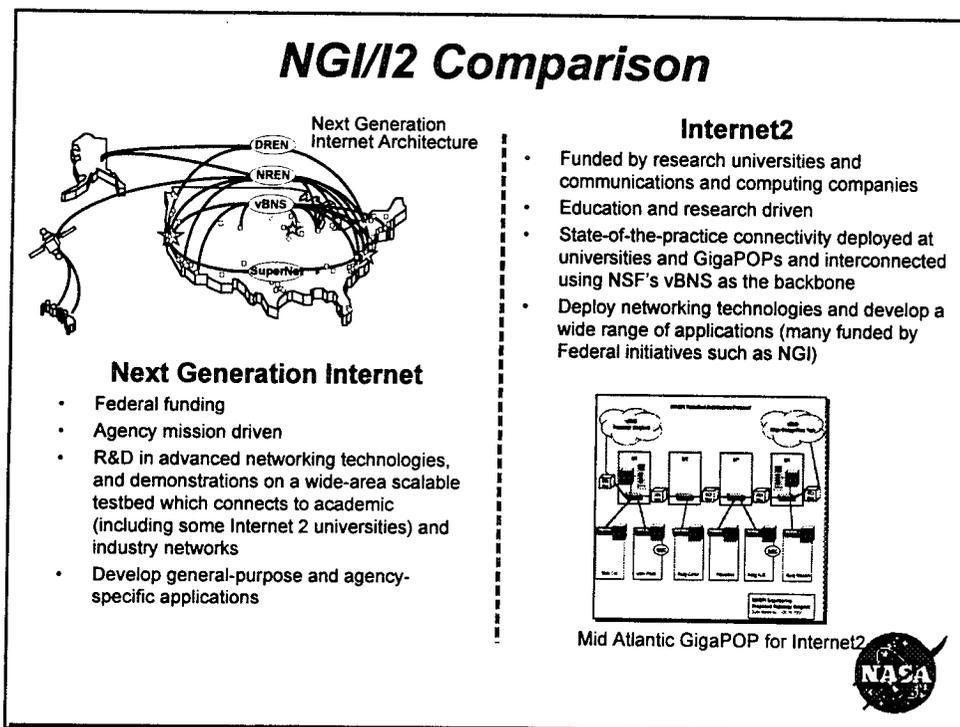
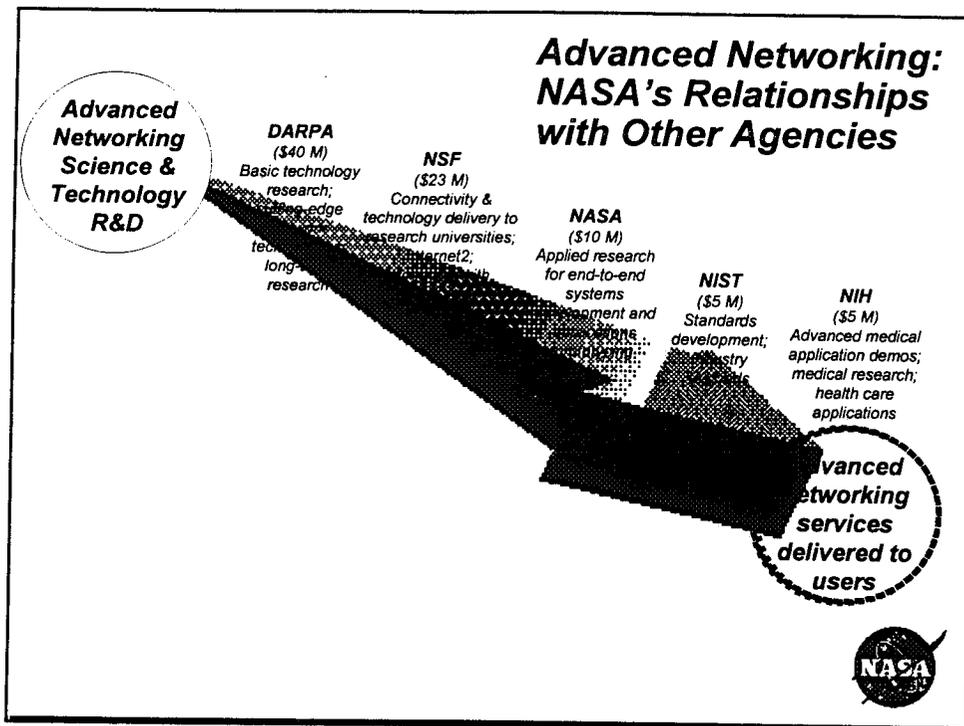
- Promote experimentation with the next generation of network technologies
- Develop a next generation network testbed to connect universities and federal research institutions at rates that are sufficient to demonstrate new technologies and support future research
- Demonstrate new applications that meet important national goals and missions



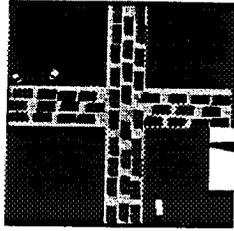
LEGEND

- DREN** - Defense Research & Engineering Network
- NREN** - NASA Research and Education Network
- vBNS** - Very High Speed Backbone Network Service (NSF)
NOTE: vBNS will support initial Internet 2 community
- SuperNet** - Terabit Research Network (DARPA)
- ◇ - NREN Application Partner
- - vBNS Partner
- ★ - Next Generation Internet Exchange





Capability



Today

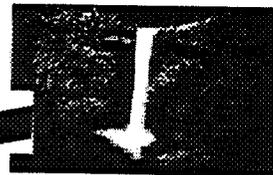
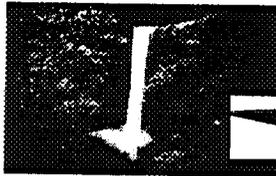
- "Best Effort"
- Unicast (point-to-point networking)
- Lots of human intervention required to manage
- Security handled by host
- Router-to-router performance monitoring

Tomorrow

- Differentiated services
- Intelligent network (scalability)
- End-to-end performance management policies and tools
- Security as part of the network
- End-to-end performance measurement
- Qualities of service
- Multicast
- End-to-end service guarantees



Capacity



Today

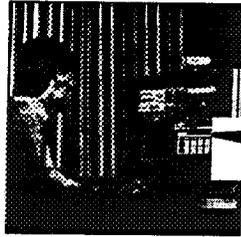
- Internet exchange points are bottlenecks
- Newer applications don't have enough bandwidth
- Available bandwidth is poorly utilized
- Duplicate traffic slows growth of advanced applications

Tomorrow

- Robust internetworking exchanges move the traffic
- New technologies provide wide-open bandwidth
- Networks are unclogged by high-speed applications running over high-speed networks
- Multicast reduces traffic exponentially



Revolutionary Applications



Today

- Electronic mail
- File transfer
- World Wide Web
- Remote login
- Travel to meetings
- Isolated design systems

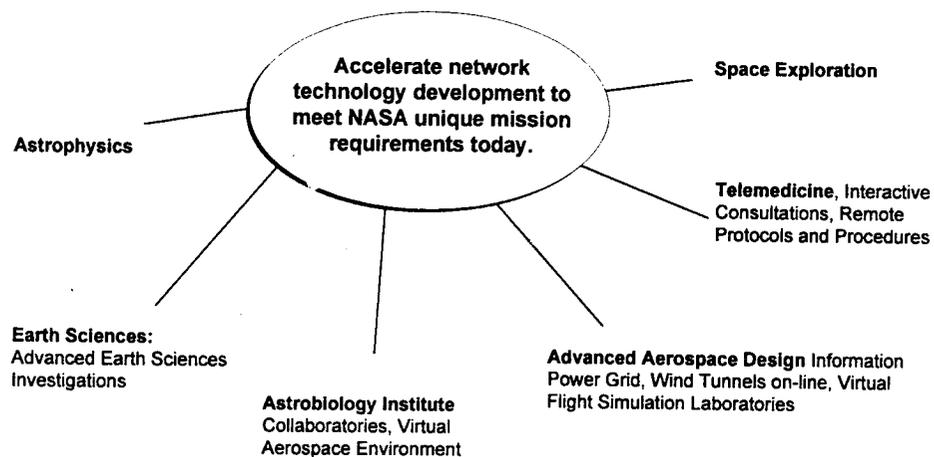


Tomorrow

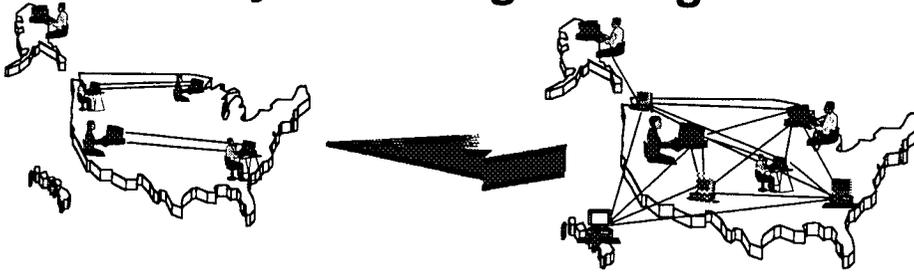
- Collaboratories
- Metacomputing
- Distance learning
- Telemedicine
- Integrated design systems
- Remote operation



NASA Mission Application Partners



Systems Engineering



Today

- Isolated research
- Many autonomous systems with different architectures and policies
- Uncoordinated, duplicate technology development efforts

Tomorrow

- Collaborative research
- True end-to-end systems technology integration across heterogeneous networks
- Partnerships allow collaboration on large-scale testbeds
- Technology scalable across wide area networks



More Information

- *National Coordination Office for Computing, Information and Communications*
 - <http://www.ccic.gov/>
- *Internet 2 (university consortium)*
 - <http://www.internet2.edu>
- *NASA Research and Education Network*
 - <http://www.nren.nasa.gov>
- *DOE*
 - <http://www.es.net>
- *DARPA*
 - <http://www.ito.darpa.mil/ResearchAreas.html>
- *NSF's Connections*
 - <http://www.vbns.net>

Next Generation Internet
<http://www.ngi.gov>

